Claims

1. A method of converting heat energy generated in an evaporator (6) to mechanical energy by expanding an evaporated working fluid which is evaporated in the evaporator (6) and expanded in an expansion device (2), **characterized in that** the expansion device (2) is formed as a low-pressure expansion device which is designed as a roots blower (2) in which the working fluid is expanded and wherein heat energy is transformed to mechanical energy.

2. The method according to claim 1, **characterized in that** the expanded working fluid is condensed in a heat exchanger (7).

3. The method according to claim 2, **characterized in that** at least part of the condensed working fluid is injected into the roots blower (2) during the expansion process.

4. The method according to claim 3, **characterized in that** at least part of the injected working fluid condenses part of the evaporated working fluid in the roots blower (2) due to heat exchange, and therefore reduces the output pressure.

5. The method according to claim 3 or claim 4, **characterized in that** the working fluid injected in the roots blower (2) is pressure-controlled.

6. The method according to any one of the preceding claims, **characterized in that** a pump (9) feeds the condensed working fluid into the evaporator (6).

7. The method according to any one of the preceding claims, **characterized in that** a separator (3) is downstream of the heat exchanger (7), which extracts a portion of the condensed working fluid for injection into the roots blower (2).

8. The method according to any one of the preceding claims, **characterized in that** a first component of the working fluid formed as a mixture is absorbed in and/or downstream of the low-pressure expansion device (2) by means of an absorption fluid wherein heat is transferred to the remaining, evaporated second component, which is recyclable.

9. The method according to claim 8, **characterized in that** the mixture, at a certain mixing ratio of the components, forms an azeotropic mixture having a minimum boiling point.

10. The method according to claim 8 or claim 9, **characterized in that** the working fluid is an azeotropic mixture or a nearly azeotropic mixture.

11. The method according to any one of the preceding claims, **characterized in that** the heat transferred during absorption heats the second component remaining evaporated to a temperature above the boiling point of the mixture, wherein the second component is condensed in a heat exchanger (7).

12. The method according to any one of the preceding claims, **characterized in that** the absorption fluid is a reversibly immobilizable solvent which, in the non-immobilized aggregate state, is the first component of the working fluid.

13. The method according to any one of the preceding claims, **characterized in that** the working fluid is an azeotropic mixture of water and silicone.

14. The method according to any one of the preceding claims, **characterized in that** the absorption fluid is a silicate solution.

15. An expansion device (2) for converting heat energy to mechanical energy by expanding an evaporated working fluid, **characterized in that** the expansion device (2) is formed as a low-pressure expansion device (2), which is designed as a roots blower (2).

16. The expansion device (2) according to claim 15, **characterized in that** the roots blower (2) is coupled to a generator (1).

17. The expansion device (2) according to claim 15 or claim 16, **characterized in that** the roots blower (2) is provided with at least one injection opening.

18. The expansion device (2) according to any one of the preceding claims, **characterized in that** the roots blower (2) has multi-blade rotors.

19. The expansion device (2) according to any one of claims 15 to 18, which is operable according to any one of the methods 1 to 14.

20. Use of a low-pressure expansion device (2), which is designed as a roots blower, for converting heat energy generated in an evaporator (6) to mechanical energy by expanding an evaporated working fluid, which is evaporated in the evaporator (6) and expanded in the low-pressure expansion device (2).